

In the Claims:

Claim 1 (original): An iterative decoding and equalizing device for high bit rate communication over frequency-selective channels with multiple transmit and receive antennas, said device comprising a decision feedback equalizer adapted to receive data from different receive antennas and including a forward filter (9) and a recursive backward filter (12) fed with calculated weighted reconstituted data from the output of a decoder (13) fed by decision means (11) and said device further including means (10) for subtracting the output of said backward filter (12) from the output data of the forward filter (9), whereby the subtracted data is fed to the input of the decision means (11) with the output of the decoder (13) and the decision means (11) produce a statistic which is forwarded to a channel decoder with weighted inputs and outputs and said decision means (11) take into account the space noise correlation at the output of the subtraction means (10) and the decision means (11) and the decoder (13) are separated by space-time interleaving at a binary level, which device is characterized in that the forward filter (9) and the backward filter (12) are iteratively adapted to minimize the mean square error at the output of the subtractor (10).

Claim 2 (original): A device according to claim 1, characterized in that the decision means (11) at the output of the subtraction means (10) of the equalizer are of the space whitening type and followed by a sphere decoder.

Claim 3 (original): A device according to claim 1, characterized in that the decision means (11) at the output of the subtraction means (10) of the equalizer are of the serial and/or

parallel type (SIC/PIC) adapted to cancel residual space interference at the output of the subtraction means (10) of the equalizer.

Claim 4 (currently amended): A device according to claim 1 ~~any preceding claim~~, characterized in that the space whitening is effected at the output of the subtraction means (10) of the equalizer.

Claim 5 (original): A device according to claim 4, characterized in that the space whitening is effected by the decision means (11).

Claim 6 (original): A device according to claim 2, characterized in that the space whitening is effected by the forward filter (9) and the backward filter (12).

Claim 7 (currently amended): A device according to claim 1 ~~any preceding claim~~, characterized in that, starting from a certain iteration, the forward filter (9) is an adapted filter.

Claim 8 (currently amended): A system for high bit rate communication over frequency-selective channels with multiple transmit and receive antennas, characterized in that it includes a receiver that includes an equalization and decoding device according to claim 1 ~~any preceding claim~~.

Claim 9 (original): A system according to claim 7, characterized in that it includes transmitter means of the ST-BICM type.

Claim 10 (original): An iterative decoding and equalizing method for high bit rate communication over frequency-selective channels with multiple transmit and receive antennas, said device using a decision feedback equalizer adapted to receive data from different receiving antennas and including a forward filter (9) and a recursive backward filter (12) fed with calculated weighted reconstituted data from the output of a decoder (13) fed by decision means (11) and using means (10) for subtracting the output of said backward filter (12) from the output data of the forward filter (9) whereby the subtracted data is fed to the input of the decision means (11) with the output of the decoder (13) and the decision means (11) produce a statistic which is forwarded to a channel decoder with weighted inputs and outputs, and said decision means (11) take into account the space noise correlation at the output of the subtraction means (10) and the decision means (11) and the decoder (13) are separated by space-time interleaving at a binary level, which method is characterized in that the forward filter (9) and the backward filter (12) are iteratively adapted to minimize the mean square error at the output of the subtractor (10).

Claim 11 (original): A method according to claim 10, characterized in that the recursive filtering of the decision feedback equalization is also adapted iteratively to minimize the mean square error at the input of the equalizer.

Claim 12 (currently amended): A method according to claim 9 ~~or claim 10~~, characterized in that the subtracted data is subjected to space whitening.

Claim 13 (currently amended): A method according to claim 9 ~~any one of claims 9 to 11~~, characterized in that the decision algorithm (11) is of the sphere decoder type.

Claim 14 (currently amended): A method according to claim 11 ~~in combination with claim 12~~, characterized in that the subtracted data is subjected to space whitening, and the space whitening is effected by the decision algorithm (11).

Claim 15 (currently amended): A method according to claim 10 ~~any preceding claim~~, characterized in that, starting from a certain iteration, the forward filter (9) is an adapted filter.